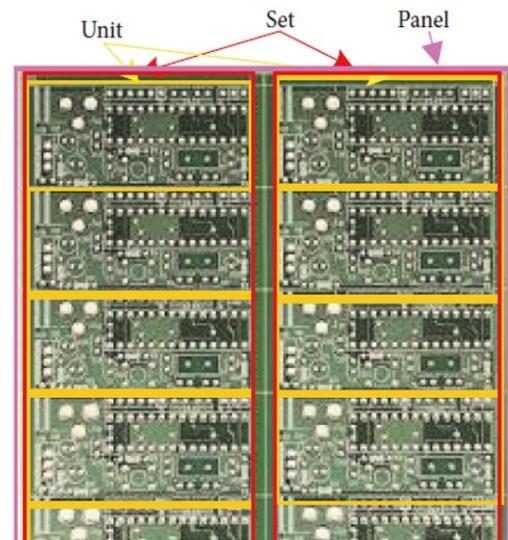


MACHINE LEARNING FOR QUALITY CONTROL OF PRINT CIRCUIT BOARD MANUFACTURING

Thales designs and creates defense systems such as radars. Because of the highest standards in terms of quality and reliability of these systems, Thales produces such systems in-house. The Print Circuit Board group at Thales is involved with creating *print circuit boards* (PCBs). Several steps are involved in PCB manufacturing, with the board being placed in specific *chemical baths* to let the necessary metal alloys settle. To improve quality control, Thales is interested in analyzing data on manufacturing failures.

To attain this goal, Thales and the 'lectoraat' Ambient Intelligence have joined forces. Ambient Intelligence is a research group at Saxion which focuses on making environments smart, especially in the domains of safety, sport and smart industry.

In general, the PCB industry has yet to find an optimal solution to deal with failure rates. Circuit boards have diverse categories, and based on the category different quality control standards are applied. Failures are a well-known phenomenon in the PCB manufacturing industry, and they are usually categorized into 14 different classes. In this case study, we have a dataset from Thales, which consists of manufacturing data and quality control data (with five categories). Our goal is to find relations related to failures in the manufacturing process, with the eventual goal of predicting failures at an early stage.




TASK DESCRIPTION

Would you like to help us to develop a model that can indicate whether PCBs are defective? This requires investigating how to analyze the available data, storing the data in a usable format for analysis, creating a predictive model, and integrating this solution into the work process of Thales. Are you interested in finding out how to apply *machine learning* in a real-life scenario? Then join us!

To summarize, the assignments goals are as follows:

- To aggregate, augment, and synchronize data using common attributes;
- To build a data model using machine learning, based on the manufacturing process and raw material data, that can categorize products as defective/not defective (more classes are preferable);
- To build a data model that can further categorize these failures into known classes;
- To build an API that uses the model at the back-end to predict PCB manufacturing failures.

PRACTICAL INFORMATION

- **Student profile:** HBO-ICT SE, graduate student.
- **Duration:** February 2020 – July 2020.
- **Compensation:** 230 euro per month (before taxes) when carrying out this assignment at Ambient Intelligence.
- **Contact person:** for more information, contact Faizan Ahmed (f.ahmed@saxion.nl) or Jeroen Linssen (j.m.linssen@saxion.nl).
- **More information:** saxion.nl/ami